Process Costing

Chapter 20

Wild and Shaw

Fundamental Accounting Principles

25th Edition

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Chapter 20 Learning Objectives

CONCEPTUAL

C1 Explain process costing and contrast it with job order costing.

C2 *Appendix 20A*- Compute process activity costs and prepare a production cost report using FIFO.

ANALYTICAL

A1 Illustrate a hybrid costing system and analyze process system yield.

PROCEDURAL

P1 Compute process activity costs using weighted average.
P2 Prepare a production cost report using weighted average.
P3 Record the flow of production costs in process costing.
P4 Record the transfer of goods across departments, to Finished Goods Inventory, and to Cost of Goods Sold.

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Learning Objective C1

Explain process costing and contrast it with job order costing.

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Process Operations

- Used for mass production of similar items.
- Continuous flow of sequential processes.
- Standardized process to make large volumes of similar products.

Company	Product	Company	Product
General Mills	Cereals	**PepsiCo**	Beverages
Pfizer	Pharmaceuticals	**Kar's**	Trail mix
Procter & Gamble	Household products	**Hershey**	Chocolate
Coca-Cola	Soft drinks	**Suja**	Organic juice

Learning Objective C1: Explain process costing and contrast it with job order costing.

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Organization of Process Operations

- Each process is a separate production department.
- Each process applies direct labor, overhead, and direct materials to move product to completion.

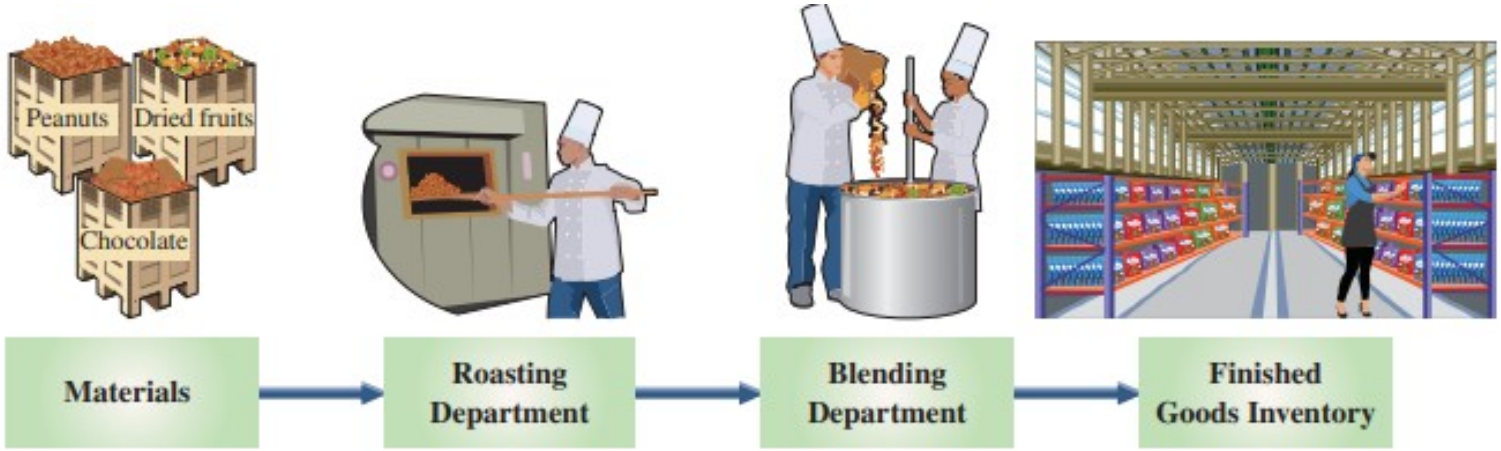

Exhibit 20.1

Learning Objective C1: Explain process costing and contrast it with job order costing.

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Comparing Process and Job Order Costing Systems

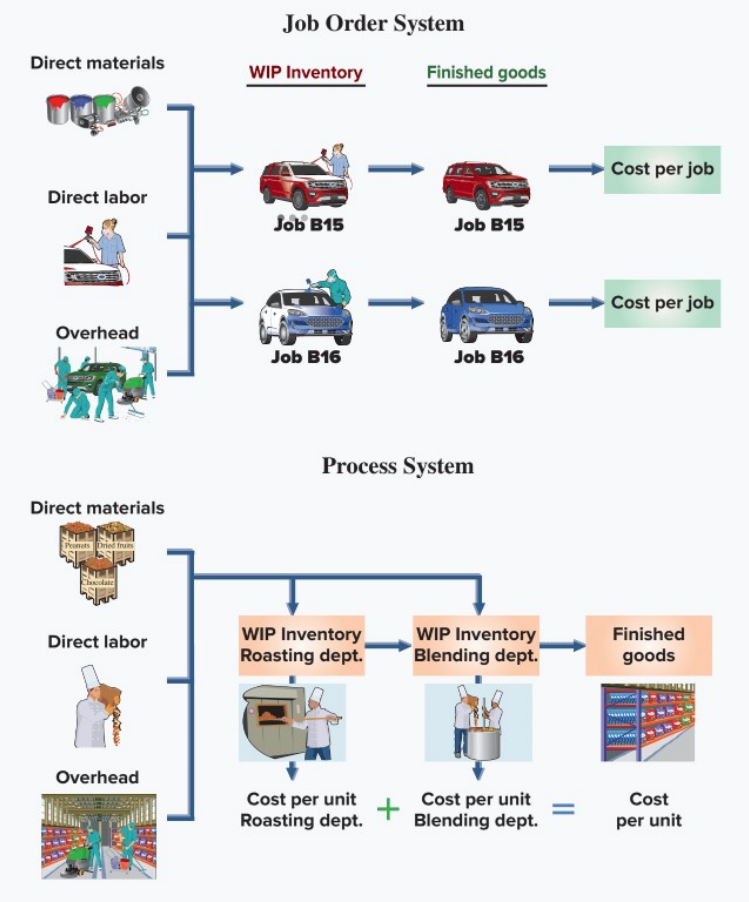

Exhibit 20.2

Learning Objective C1: Explain process costing and contrast it with job order costing.

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Learning Objective P1

Compute process activity costs using weighted average.

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Process Costing Demonstration

The following four steps demonstrate process costing using the weighted average method:

1. **Determine physical flow of units.**
2. **Compute equivalent units of production.**
3. **Compute cost per equivalent unit of production.**
4. **Assign and reconcile costs.**

Learning Objective P1: Compute process activity costs using weighted average.

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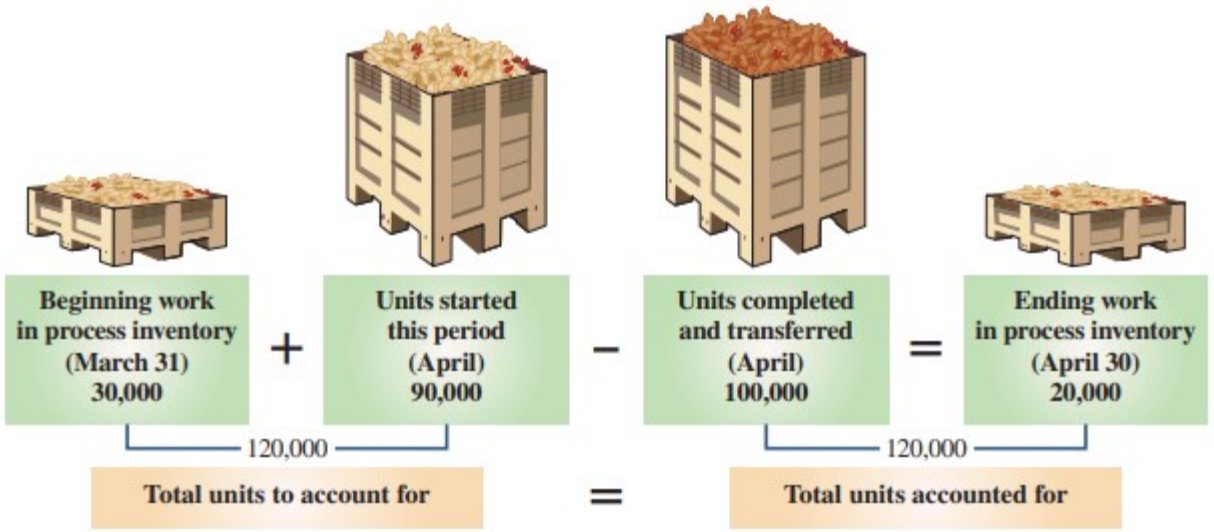
Step 1: Determine Physical Flow of Units

Exhibits 20.3 & 20.4



Roasting Department

Units to Account For		Units Accounted For	
Beginning work in process	30,000 units	Units completed and transferred out	100,000 units
Units started this period	90,000 units	Ending work in process	20,000 units
Total units to account for	**120,000 units**	Total units accounted for	**120,000 units**

reconciled

Learning Objective P1: Compute process activity costs using weighted average.

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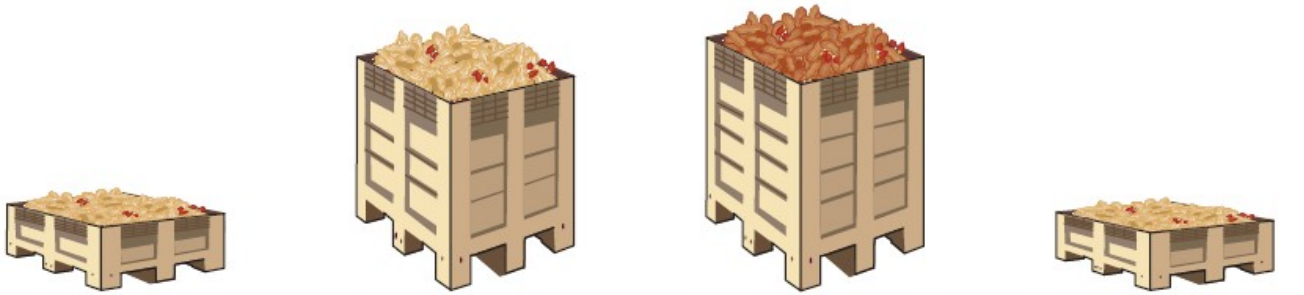
Step 2: Compute Equivalent Units of Production 1

Exhibit 20.5



Beginning work in process inventory (March 31) 30,000	Units started this period (April) 90,000	Units completed and transferred (April) 100,000	Ending work in process inventory (April 30) 20,000
Percent Complete			
Direct materials	100%	100%	100%
Conversion	65%	100%	25%

Learning Objective P1: Compute process activity costs using weighted average.

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Step 2: Compute Equivalent Units of Production 2

Exhibit 20.6

Equivalent units of production (EUP) = Equivalent units completed and transferred out + Equivalent units in ending work in process

Exhibit 20.7

	Roasting Department				
		Direct Materials		Conversion	
	Units	Percent Complete	Equivalent Units of Production	Percent Complete	Equivalent Units of Production
Completed and transferred out	100,000	100%	100,000	100%	100,000
Ending work in process	20,000	100%	20,000	25%	5,000
			120,000 EUP		105,000 EUP

Units Accounted For (Step 1)

Learning Objective P1: Compute process activity costs using weighted average.

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Step 3: Compute Cost Per Equivalent Unit

Roasting Department: Production Cost Data (April)		
Beginning work in process inventory		
Direct materials	$ 81,000	
Conversion	108,900	$ 189,900
Costs added this period		
Direct materials	279,000	
Conversion	376,200	655,200
Total production costs		$845,100

Exhibit 20.8

Roasting Department		
Cost per Equivalent Unit of Production	**Direct Materials**	**Conversion Costs**
Costs of beginning work in process.	$ 81,000	$108,900
Costs added this period.	279,000	376,200
Total costs.	$360,000	$485,100
÷ Equivalent units of production (from step 2)	120,000 EUP	105,000 EUP
= Cost per equivalent unit of production.	$3.00 per EUP	$4.62 per EUP

Exhibit 20.9

Learning

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Step 4: Assign and Reconcile Costs

Exhibit 20.10

From Step 2 From Step 3

Roasting Department

	EUP	Cost per EUP	Total Cost	
Completed and transferred out				
Direct materials	100,000	$3.00	$300,000	
Conversion	100,000	$4.62	462,000	
				$762,000
Ending work in process				
Direct materials	20,000	$3.00	$ 60,000	
Conversion	5,000	$4.62	23,100	
				83,100
Total costs accounted for				$845,100

Learning Objective P1: Compute process activity costs using weighted average.

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Using Process Cost Information

- Control costs: compare to prior months and take necessary corrective action.
- Evaluate performance: evaluate department managers based on their control of costs.
- Evaluate process improvements: examine how costs per EUP change after process improvements.
- Prepare financial statements: cost of goods sold and ending inventory are reported on income statement and

Learning Objective P1: Compute process activity costs using weighted average.

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Learning Objective P2

Prepare a production cost report using weighted average.

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Process Cost Report[1]

Exhibit 20.11

GenX—ROASTING DEPARTMENT
Production Cost Report (Weighted Average Method) For Month Ended April 30

1

Units to Account For:		**Units Accounted For:**	
Beginning work in process	30,000	Completed and transferred out	100,000
Units started this period	90,000	Ending work in process	20,000

2

Equivalent Units of Production (EUP)	**Direct Materials**		**Conversion**		
	Units	**Percent Complete**	**Equivalent Units of Production**	**Percent Complete**	**Equivalent Units of Production**
Completed and transferred out	100,000	100%	100,000	100%	100,000
Ending work in process .	90,000	100%	20,000	100%	20,000
			120,000 EUP		105,000 EUP

Learning Objective P2: Prepare a production cost report using weighted average.

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Process Cost Report 2

Exhibit 20.11

3

Cost per EUP	Direct Materials	Conversion
Costs of beginning work in process	$ 81,000	$108,900
Costs added this period	279,000	376,200
Total costs	$360,000	$485,100
÷ Equivalent units of production	120,000 EUP	105,000 EUP

4

Cost assignment	EUP	Cost per EUP		Total Cost
Completed and transferred out				
Direct materials	100,000	$3.00	$300,000	
Conversion	100,000	$4.62	462,000	
				$ 762,000
Ending work in process				
Direct materials .	20,000	$3.00	$ 60,000	
Conversion	5,000	$4.62	23,100	
				83,100
Total costs accounted for				$845,100

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Learning Objective P3

Record the flow of production costs in process costing.

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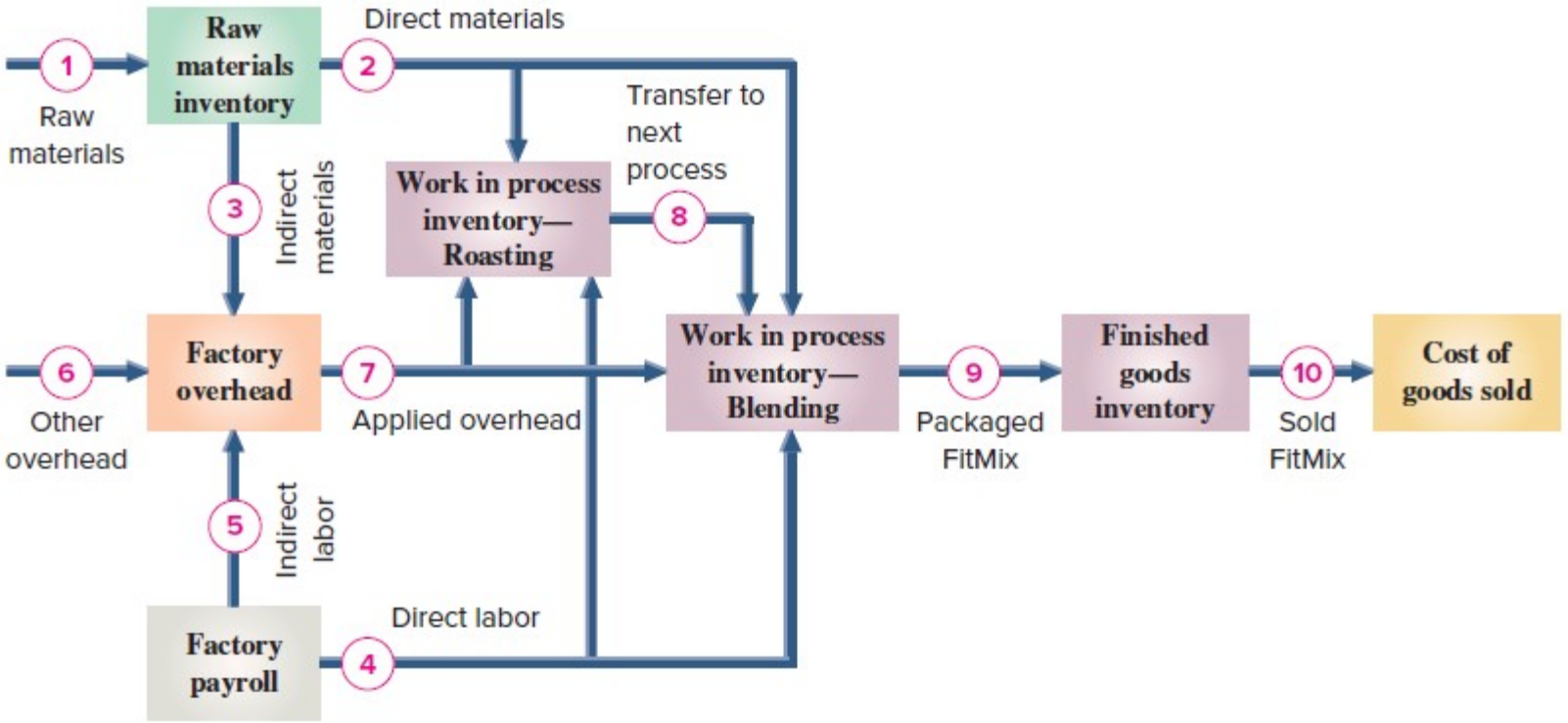
Accounting for Process Costing

Exhibit 20.12



Learning Objective P3: Record the flow of production costs in process costing.

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Accounting for Production Costs

Exhibit 20.13

GenX—Cost Data for Month Ending April 30			
Raw materials inventory (March 31)	$100,000	Factory payroll for April	
Beginning work in process inventories (March 31)		Direct labor—Roasting	$171,000
Work in process—Roasting	$189,900	Direct labor—Blending	183,160
Work in process—Blending	151,688	Indirect labor	78,350
Materials purchased (on credit)	$400,000	Other overhead costs added in April	
Materials requisitions during April		Insurance expense—Factory	$ 11,930
Direct materials—Roasting	$279,000	Utilities expense—Factory	7,945
Direct materials—Blending	102,000	Depreciation expense—Factory equipment	220,650
Indirect materials	71,250	Other (paid in cash)	34,867

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Accounting for Material Costs

1	Raw Materials Inventory	400,000	
	Accounts Payable		400,000
2	Work in Process Inventory—Roasting	279,000	
	Work in Process Inventory—Blending	102,000	
	Raw Materials Inventory		381,000
3	Factory Overhead	71,250	
	Raw Materials Inventory		71,250
	Record indirect materials used.		

Learning Objective P3: Record the flow of production costs in process costing.

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Accounting for Labor Costs

4	Work in Process Inventory—Roasting	171,000	
	Work in Process Inventory—Blending		
	Factory Wages Payable		354,160
	Record direct labor used		
5	Factory Overhead	78,350	
	Factory Wages Payable		78,350
	Record direct materials used.		

transaction on final line of entry.

Learning Objective P3: Record the flow of production costs in process costing.

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Accounting for Factory Overhead

6	Factory Overhead	275,392	
	Prepaid Insurance		11,930
	Utilities Payable		7,945
	Cash		34,867
	Accumulated Depreciation—Factory Equipment		220,650
	Record other overhead costs incurred		

Production Department	Direct Labor Cost	Predetermined Rate	Overhead Applied
Roasting	$171,000	120%	$205,200
Blending	183,160	120	219,792
Total			$424,992

7	Work in Process Inventory—Roasting	205,200	
	Work in Process Inventory—Blending	219,792	
	Factory Overhead		424,992
	Applied overhead at 120% of direct labor		

Exhibit 20.14

Learning Objective P3: Record the flow of production costs in process costing.

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Learning Objective P4

Record the transfer of goods across departments, to Finished Goods Inventory, and to Cost of Goods Sold.

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Transfers Across Departments

8	Work in Process Inventory—Blending	762,000	
	Work in Process Inventory—Roasting		762,000
	Transfer units from Roasting to Blending		

Exhibit 20.15

WIP Inventory—Roasting (Units)

Beginning	30,000 units	
Started	90,000 units	
Subtotal	120,000 units	
		100,000 units transferred to Blending
Ending	20,000 units	

WIP Inventory—Blending (Units)

Beginning	12,000 units	
Transferred from Roasting	100,000 units	
Subtotal	112,000 units	
		97,000 units transferred to Finished Goods Inventory
Ending	15,000 units	

WIP Inventory—Roasting ($)

Beginning*	189,900	
Direct materials	279,000	
Conversion	376,200	
Subtotal	845,100	
		762,000 Transferred to Blending
Ending	83,100	

WIP Inventory—Blending ($)

Beginning	151,688	
Transferred from Roasting	762,000	
Direct materials	102,000	
Conversion	402,952	
Subtotal	1,418,640	
		1,262,940 Transferred to Finished Goods
Ending	155,700	

*$81,000 direct materials + $108,900 conversion

Learning Objective P4: Record the transfer of goods across departments, to Finished Goods Inventory, and to Cost of Goods Sold.

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Accounting for Transfer to Finished Goods

9	Finished Goods Inventory	1,262,940	
	Work in Process Inventory—Blending		1,262,940
	Record transfer of completed goods.		

GenX—Cost of Goods Sold

Beginning finished goods inventory	$ 338,520
+ Cost of goods manufactured	1,262,940
= Cost of goods available for sale	1,601,460
− Ending finished goods inventory	260,400
= Cost of goods sold	$1,341,060

Exhibit 20.16

Learning O ed
Goods Inventory, and to Cost of Goods Sold.

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Accounting for Cost of Goods Sold

Exhibit 20.16

GenX—Cost of Goods Sold

Beginning finished goods inventory	$ 338,520
+ Cost of goods manufactured	1,262,940
= Cost of goods available for sale	1,601,460
− Ending finished goods	260,400

10	Accounts Receivable	1,915,800	
	Sales		1,915,800
10	Cost of Goods Sold	1,341,060	
	Finished Goods Inventory		1,341,060
	Record cost of goods sold for April.		

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Goods Inventory, an

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Financial Statement Reporting

GenX Income Statement (partial) For Month Ended April 30	
Sales	$1,915,800
Cost of goods sold	1,341,060
Gross profit	$ 574,740

GenX Balance Sheet (partial) April 30	
Inventories	
Raw materials*	$ 47,750
Work in process†	238,800
Finished goods‡	260,400
Total	$546,950

* Beginning raw materials inventory + Raw materials purchased – Materials requisitioned (from Exhibit 20.13) = $100,000 + $400,000 − $279,000 − $102,000 − $71,250 = $47,750. † Work in Process Inventory Roasting + Work in Process Inventory Blending (from Exhibit 20.15) = $83,100 + $155,700 = $238,800. ‡ From Exhibit 20.16. 00.75

$$\text{Cost per completed unit} = \frac{\text{Cost of goods manufactured this period}}{\text{Number of units transferred to finished goods}} = \frac{\$1,262,940}{97,000} = \$13.02$$

Learning Objective P4: Record the transfer of goods across departments, to Finished Goods Inventory, and to Cost of Goods Sold.

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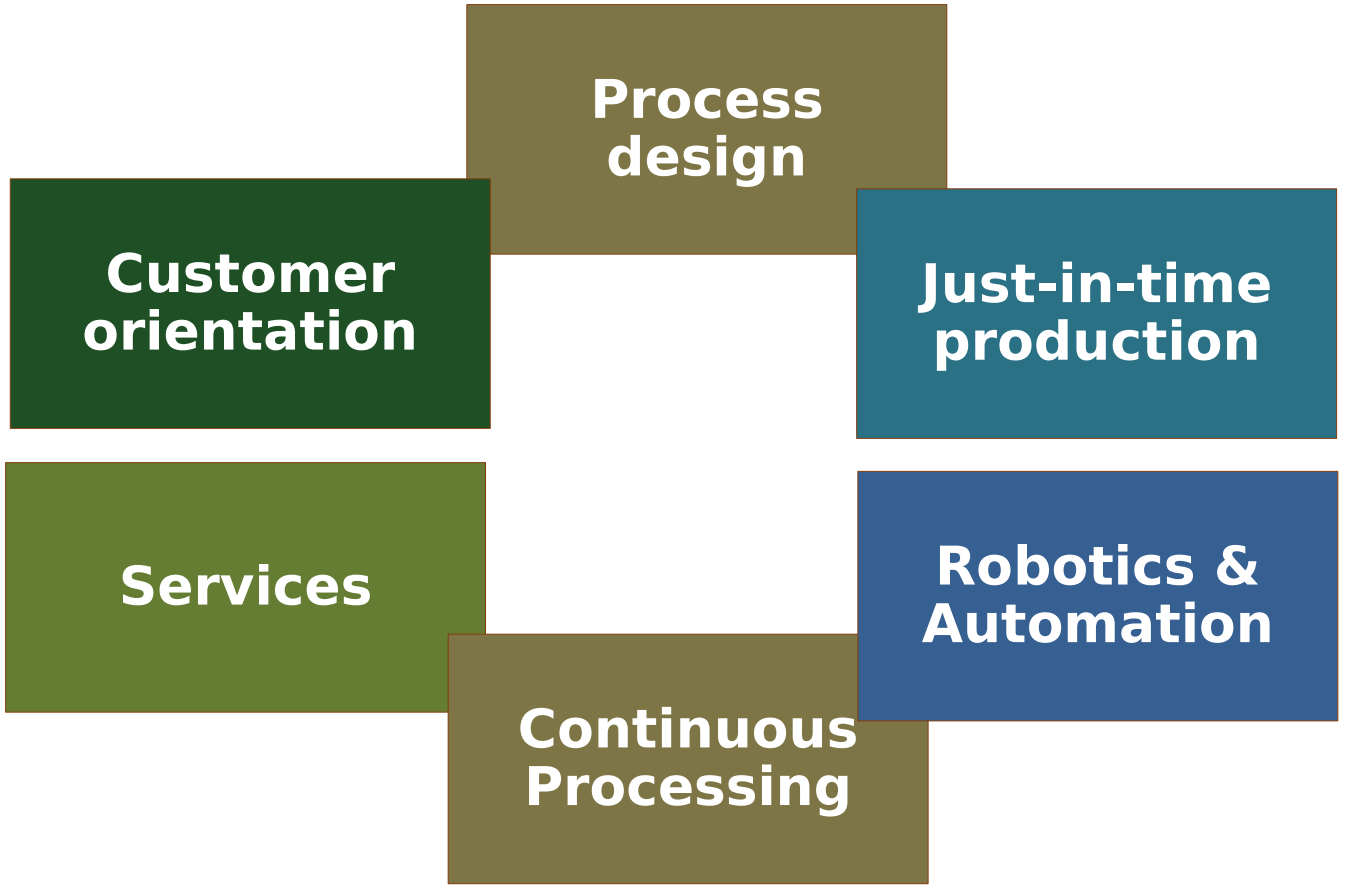
Trends in Process Operations



Learning Objective P4: Record the transfer of goods across departments, to Finished Goods Inventory, and to Cost of Goods Sold.

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Learning Objective A1

Illustrate a hybrid costing system and analyze process system yield.

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Hybrid Costing System

- **Hybrid system (operation costing system) contains features of both process and job order operations.**
- **Requires a hybrid costing system to determine cost of products/services.**
- **Companies try to standardize processes while also meeting customer needs.**
- **Important to monitor and control costs.**

Learning Objective A1: Illustrate a hybrid costing system and analyze process system yield.

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Hybrid Costing System – Illustration and Yield

Hybrid Costs	Per Car
Direct materials (excluding wheels and sound system)	$10,600
Conversion	12,000
Assembly process costs	$22,600
Customer choices: Wheel types	$240; $330; $480
Customer choices: Sound system types	$620; $840; $1,360

$$\text{Yield} = \frac{\text{Nondefective units produced}}{\text{Units that could have been produced}} = \frac{9{,}900}{10{,}000} = 99\%$$

Learning Objective A1: Illustrate a hybrid costing system and analyze process system yield.

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Learning Objective C2

Appendix□Compute process activity costs and prepare a production cost report using FIFO.

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FIFO Method of Process Costing

The following four steps demonstrate process costing using the FIFO method:

1. **Determine physical flow of units.**
2. **Compute equivalent units of production.**
3. **Compute cost per equivalent unit of production.**
4. **Assign and reconcile costs.**

Learning Objective C2: Compute process activity costs and prepare a production cost report using FIFO.

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Step 1: Determine Physical Flow of Units – FIFO[1]

Exhibit 20A.1

Beginning work in process inventory	30,000 units	Units completed and transferred out	100,000 units
Units started this period	90,000 units	Ending work in process inventory	20,000 units

Units to account for = Beginning work in process inventory + Units started this period

= 30,000 units + 90,000 units

= 120,000 units

Units started and completed = Completed and transferred out − Beginning work in process inventory

= 100,000 units − 30,000 units

= 70,000 units

Learning Objective C2: Compute process activity costs and prepare a production cost report using FIFO.

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Step 1: Determine Physical Flow of Units – FIFO 2

Exhibit 20A.2

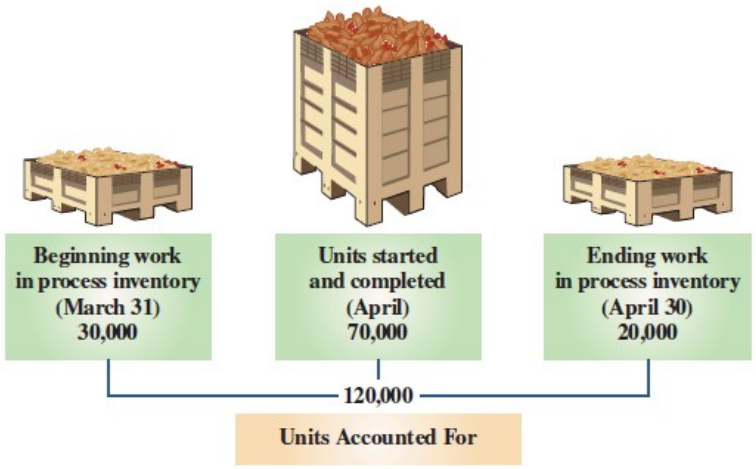
Beginning work in process inventory (March 31) 30,000
Units started and completed (April) 70,000
Ending work in process inventory (April 30) 20,000
120,000
Units Accounted For

Exhibit 20A.3

Roasting Department

Units to Account For		Units Accounted For	
Beginning work in process. . . .	30,000 units	Beginning work in process	30,000 units
Units started	90,000 units	Units started and completed.	70,000 units
		Ending work in process	20,000 units
Total units to account for	120,000 units	Total units accounted for.	120,000 units

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Learning Objective C2: Compute process activity costs and prepare a production cost report using FIFO.

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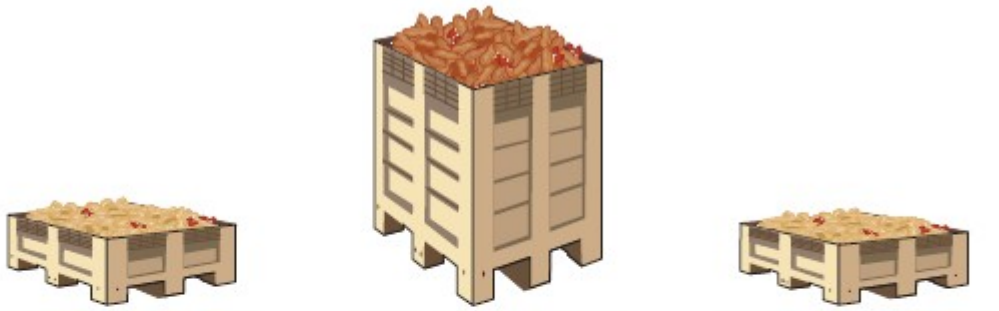
Step 2: Compute Equivalent Units of Production – FIFO

Exhibit 20A.4



Beginning work in process inventory (March 31) 30,000	Units started and completed (April) 70,000	Ending work in process inventory (April 30) 20,000

Percent Complete			
	Direct materials	100%	100%	100%
	Conversion	65%	100%	25%

Exhibit 20A.5

Equivalent units of production (EUP) = Number of equivalent units needed to complete beginning work in process + Number of whole units started, completed, and transferred out + Number of equivalent units in ending work in process

Learning Objective C2: Compute process activity costs and prepare a production cost report using FIFO.

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Step 2: Compute Equivalent Units of Production – FIFO Illustration

Exhibit 20A.6

Roasting Department					
	Direct Materials			Conversion	
	Units	Percent Added	Equivalent Units of Production	Percent Added	Equivalent Units of Production
Beginning work in process	30,000	0%	0	35%	10,500
Started and completed	70,000	100%	70,000	100%	70,000
Ending work in process	20,000	100%	20,000	25%	5,000
			90,000 EUP		85,500 EUP

Learning Objective C2: Compute process activity costs and prepare a production cost report using FIFO.

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Step 3: Compute Cost Per Equivalent Unit – FIFO

Exhibit 20A.7

Roasting Department: Production Cost Data (April)		
Beginning work in process inventory		
Direct materials	$ 81,000	$ 189,900
Conversion	108,900	
Costs added this period		
Direct materials	279,000	
Conversion	376,200	655,200

Exhibit 20A.8

Roasting Department		
Cost per Equivalent Unit of Production	**Direct Materials**	**Conversion**
Costs added this period	$ 279,000	$ 376,200
÷ Equivalent units of production (from step 2)	90,000 EUP	85,500 EUP
Cost per equivalent unit of production	$3.10 per EUP	$4.40 per EUP

Learning O
report using FIFO.

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Step 4: Assign and Reconcile Costs – FIFO

Roasting Department	EUP	Cost per EUP	Total Cost	
Beginning work in process				$ 189,900
To complete beginning work in process				
Direct materials	0	$3.10	$ 0	
Conversion	10,500	$4.40	46,200	46,200
Started and completed				
Direct materials	70,000	$3.10	217,000	
Conversion		$4.40	308,000	
				525,000
Completed and transferred out				761,100
Ending work in process				
Direct materials	20,000	$3.10	62,000	
Conversion	5,000	$4.40	22,000	84,000
Total costs accounted for				**$845,100**

Exhibit 20A.9

Learning
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End of Chapter 20

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